

Claims

[c1] What is claimed is:

1. A die-level prober for testing unpackaged liquid crystal on silicon (LCOS) display panels, each of which comprises a first substrate, a second substrate, a liquid crystal layer positioned between the first substrate and the second substrate, at least a first contact pad positioned on the first substrate, and at least a second contact pad positioned on the second substrate, the die-level prober comprising:

a chuck;

a tray positioned on a surface of the chuck comprising:
at least a recession for situating at least one of the unpackaged LCOS display panels; and

a conductive connecting structure positioned on one side of the recession, the connecting structure having a first portion for electrically contacting the first contact pad and a second portion electrically connected to the first portion; and

a probe card positioned above the tray, the probe card having at least two probes for electrically contacting the second contact pad and the second portion respectively.

- [c2] 2.The die-level prober of claim 1 wherein the first substrate is partially lapped over the second substrate, and the first contact pad is located on a portion of the first substrate that is not lapped over the second substrate, while the second contact pad is located on a portion of the second substrate that is not lapped over the first substrate.
- [c3] 3.The die-level prober of claim 2 wherein the first substrate is a transparent substrate and the second substrate is a semiconductor wafer.
- [c4] 4.The die-level prober of claim 3 wherein the first contact pad is a conductive photoresist layer and the second contact pad is a bonding pad.
- [c5] 5.The die-level prober of claim 2 wherein the first substrate is a semiconductor wafer and the second substrate is a transparent substrate.
- [c6] 6.The die-level prober of claim 5 wherein the first contact pad is a bonding pad and the second contact pad is a conductive photoresist layer.
- [c7] 7.The die-level prober of claim 1 wherein the second portion of the connecting structure is a third contact pad positioned on a surface of the tray.

- [c8] 8.The die-level prober of claim 7 wherein the first portion of the connecting structure is a conductive clamp.
- [c9] 9.The die-level prober of claim 7 wherein the first portion of the connecting structure comprises at least one conductive probe.
- [c10] 10.The die-level prober of claim 7 wherein the first portion of the connecting structure is a fourth contact pad positioned on the surface of the tray.
- [c11] 11.The die-level prober of claim 1 wherein each tray is utilized to situate one of the unpackaged LCOS display panels.
- [c12] 12.The die-level prober of claim 1 wherein each tray is utilized to simultaneously situate the unpackaged LCOS display panels that are electrically connected to each other.
- [c13] 13.A die-level prober for testing unpackaged dies, each of which comprises at least a first contact pad and a second contact pad, the die-level prober comprising:
 - a chuck;
 - a tray positioned on a surface of the chuck comprising:
 - at least a recession for situating at least one of the unpackaged dies; and
 - a conductive connecting structure positioned on one side

of the recession, the connecting structure having a first portion for electrically contacting the first contact pad and a second portion electrically connected to the first portion; and
a probe card positioned above the tray, the probe card having at least two probes for electrically contacting the second contact pad and the second portion respectively.

[c14] 14. The die-level prober of claim 13 wherein each of the unpackaged dies is an unpackaged liquid crystal on silicon (LCOS) display panel.

[c15] 15. The die-level prober of claim 14 wherein the unpackaged LCOS display panel comprises:
a transparent substrate;
a semiconductor wafer partially lapped over the transparent substrate;
a liquid crystal layer positioned between the transparent substrate and the semiconductor wafer;
a conductive photoresist layer positioned on a surface of the transparent substrate, a portion of the conductive photoresist layer being located between the liquid crystal layer and the transparent substrate; and
at least a bonding pad positioned on a surface of the semiconductor wafer that is not lapped over the transparent substrate.

- [c16] 16.The die-level prober of claim 15 wherein the first contact pad is the conductive photoresist layer and the second contact pad is the bonding pad.
- [c17] 17.The die-level prober of claim 15 wherein the first contact pad is the bonding pad and the second contact pad is the conductive photoresist layer.
- [c18] 18.The die-level prober of claim 15 wherein the second portion of the connecting structure is a third contact pad positioned on a surface of the tray.
- [c19] 19.The die-level prober of claim 18 wherein the first portion of the connecting structure is a conductive clamp.
- [c20] 20.The die-level prober of claim 18 wherein the first portion of the connecting structure comprises at least one conductive probe.
- [c21] 21.The die-level prober of claim 18 wherein the first portion of the connecting structure is a fourth contact pad positioned on the surface of the tray.
- [c22] 22.The die-level prober of claim 13 wherein each tray is utilized to situate one of the unpackaged dies.
- [c23] 23.The die-level prober of claim 13 wherein each tray is utilized to simultaneously situate the unpackaged dies

that are electrically connected to each other.